

A fortnight's visit to Morocco in April 1983

W. O. DE PRINS, N. J. J. KOK and F. TURELINCKX

Diksmuidelaan 176, B-2600 Antwerpen (Belgium) ;
Waalstraat 33, NL-5374 CH Schayk (the Netherlands) ;
Baksveld 8, B-3180 Westerlo (Belgium).

On 2nd April we took off from Zaventem airport for what turned out to be a most interesting and rewarding visit to Morocco. We landed in Agadir at about noon where a most discouraging looking Renault 4 was waiting to take us into town. We deposited our luggage in the hotel «Les Cinq parties du Monde» and, not having time for lunch, immediately drove to the north to Imouzzèr-Ges with its famous Cascades. In the sunny afternoon, about 20°C, we netted our first Moroccan butterflies which were flying over small fields. The most interesting species were *Tomares mauretanicus* LUCAS and *Cigaritis allardi* OBERTHÜR, both flying in low numbers and occasionally setting down on stones or rocks in the sunshine.

The next morning we ventured on a raid some 150 km to the south where we hoped to find *Melitaea deserticola* OBERTHÜR and *Euchloe falloui* ALLARD. We passed very promising biotopes at the road-side between Tiznit and Goulmime but because of a glacial wind no insects were on the wing and we had to return empty handed. Some kilometers north of Tiznit we discovered a nearly abandoned oasis where we saw our first *Elphinstonia charlonia* DONZEL. This species was flying in rather large numbers low over the fields and hard to catch because of its fast flight in the still stormy wind. In the same locality were also flying *Euchloe belemia* ESPER and *Zizeeria knysna* TRIMEN.

On 4th April the weather improved and we visited several oases and fields in the Taroudannt region. The temperature rose to 30°C and a lot of butterflies were on the wing, the most interesting species being *Danaus chrysippus* L. sailing above its foodplant *Asclepias curassavica*. Lots of Pierids were common in an abandoned field : *Euchloe simplonia* FREYER, *Euchloe belemia* ESPER, *Elphinstonia charlonia* DONZEL and others. Some specimens of *Gegenes nostradamus* F. and a single *G. pumilio* HOFFMANN-SEGG were resting on a hot and sandy open space in the vegetation and also *Carcharodus alceae* ESPER was seen here. Only a few blues were seen

like *Zizeeria knysna* TRIMEN and *Tarucus teophrastus* F. In the orchards we found very fresh *Amata mogadorensis* BLACHIER just emerging. On our way back to Agadir we stopped at Ait-Melloul where we found numerous *Tarucus teophrastus* F. and some *T. rosaceus* Austaut. These insects were resting on spiny *Zizyphus* bushes and were easily disturbed.

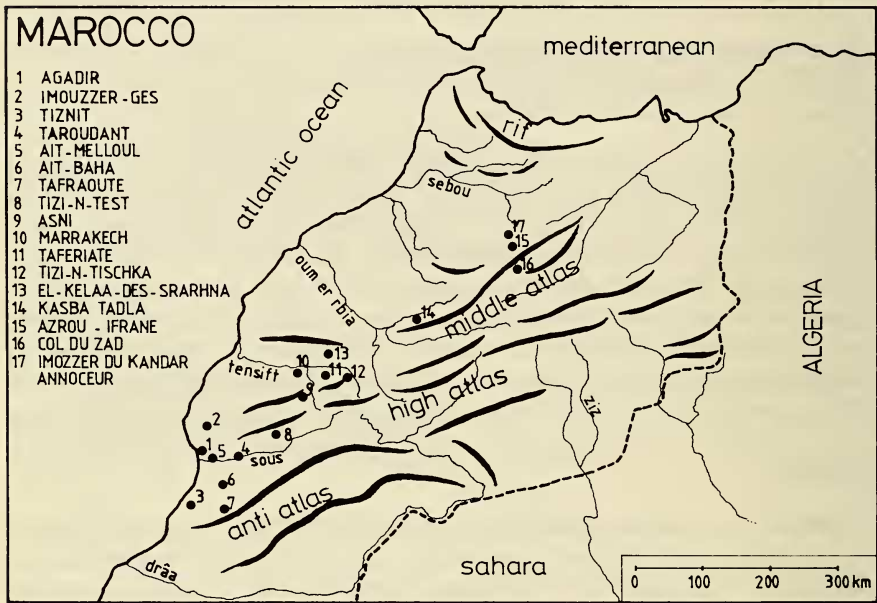


Fig. 1. Map of Morocco showing the different places that were visited (del. F. Turelinckx).

The next day we revisited the Cascades region but in spite of the warm weather very few butterflies were fluttering over the field and except for a single *Iphiclides feisthamelii* DUPONCHEL., no other species than the ones of our first visit to this area were observed.

On 6th April we once again risked a raid to the south, but this time we chose a different itinerary taking us through Biougra and Ait-Baha to Tafraoute. At Ait-Baha we visited a small dry valley where lots of *Zizyphus* bushes were growing which housed plenty of *Tarucus teophrastus* F. On this spot we caught our first *Melitaea* specimens and although we had hoped to find *Melitaea deserticola* OBERTHÜR in this arid area, they all turned out to be *Melitaea didyma* ESPER. When we arrived at

Tafraoute, the temperature had risen to above 30°C and a firm wind was blowing. We stopped for a quick roadside lunch and saw many interesting skippers darting at the dry river bed at our feet while we were eating. Undoubtedly the most interesting of these was *Spialia doris* WALKER of which only very few specimens were caught. *Carcharodus alceae* ESPER was rather rare too but *Spialia sertorius* HOFFMANNSEGG was more common. In this locality a single *Tomares ballus* F. was caught together with some *Melitaea phoebe* DENIS & SCHIFFERMÜLLER, *Anthocharis belia* L. and *Elphinstonia charlonia* DONZEL. In a small *Acacia* tree we spotted some specimens of *Azanus jesous* GUÉRIN.



Fig. 2. Oasis near Tiznit, Anti Atlas (nr. 3 on the map), biotope of *Elphinstonia charlonia* DONZEL, *Euchloe belemia* ESPER, *Zizeeria knysna* TRIMEN etc. (Foto : W. O. DE PRINS).

The next day we decided to move our headquarters from Agadir to the central part of the High Atlas crossing the mountain range from south to north in Tizi-n-Test, somewhat over 2000 m altitude. And although our roadmap indicated that this mountain pass is sometimes closed from December until April we did not see any snow at all. On the contrary, the weather was very nice with a temperature of 27°C at an altitude of 1200 m. Here we found our first *Colotis evagore* KLUG, *Lysandra punctifera* OBERTHÜR and *Carcharodus stauderi* REVERDIN on the roadside. *Melitaea didyma* ESPER, *M. phoebe* DENIS & SCHIFFERMÜLLER and *Pseudophilo-*

tes abencerragus PIERRET were on the wing too. Higher on the mountain at about 1700 m we found *Anthocharis belia* L., *Pieris brassicae* L. and the first *Glaucopteryx melanops* BOISDUVAL. The sun was setting and we had to reach Asni where we made ourselves comfortable in the "Grand Hotel du Toubkal", a very beautiful establishment where famous entomologists like the late baron DE WORMS and L. HIGGINS had stayed during their visits in the region.



Fig. 3. Open place in pine forest at Taferiate, High Atlas, (nr. 11 on the map), biotope of *Zerynthia rumina* L., *Tomares ballus* F., *T. mauretanicus* LUCAS and several other interesting species. (Foto : W. O. DE PRINS).

On 8th April we drove to Taferiate, a small village at about 40 km south-east of Marrakech, where we discovered a very interesting biotope at both sides of the road. Both *Tomares ballus* F. and *T. mauretanicus* LUCAS were resting on the hot sand between *Cistus* bushes. *Azanus jesous* GUÉRIN could be chased from *Acacia* trees. *Elphinstonia charlonia* DONZEL., *Tarucus teophrastus* F. and *Anthocharis belia* L. were not rare at all. In the shadow of a pine forest our first *Zerynthia rumina* L. was netted and under the same circumstances we found the first *Cupido lorquini* HERRICH-SCHÄFFER specimens. *Melanargia ines* HOFFMANNSEGG was seen here too, though very rarely. The only species we had not been able to spot, in spite of intensive searching, was *Thymelicus hamza* OBERTHÜR.

On 9th April we planned to drive to the Middle Atlas, about 450 km further north. We made our first stop in the neighbourhood of El-Kelâades-Srarhna where we hoped in vain to find *Thersamonia phoebus* BLACHIER. We only netted some *Elphinstonia charlonia* DONZEL and *Euchloe belemia* ESPER. At about lunch time we reached Kasba Tadla where lots of Pierids were fluttering in an orchard beside the road. *Tomares ballus* F. and *Pseudophilotes abencerragus* PIERRET were flying here too. As it was getting late we drove without other stops to Ifrane but this typical French city with its very luxurious hotels did not appeal to us so we returned to Azrou where we met with a kind reception in the Panorama hotel.

The next morning we set out for the Col du Zad but we noticed at once that the season had not advanced sufficiently. Enormous patches of snow were still covering a great deal of the highest mountain parts and only *Eurrhantis plummistaria* VILLERS was on the wing in large numbers. A single *Pyrgus onopordi* RAMBUR was netted too. At Mischliffen, still at nearly 2000 m high but protected by pine trees, we found a small locality where *Tomares mauretanicus* LUCAS was very common. Some kilometers further, just before Ifrane at an altitude of about 1600 m we discovered the place which DE WORMS called his "gold mine". And indeed, it turned out to be one of the richest places we ever visited in Morocco. Both the *Tomares* species were common as was *Zerynthia rumina* L., *Anthocharis belia* L. and *Cupido lorquini* HERRICH-SCHÄFFER. *Lysandra punctifera* OBERTHÜR and *Pyrgus onopordi* RAMBUR were much rarer and a single specimen of *Aricia cramera* ESCHSCHOLTZ was netted. Some worn specimens of *Nymphalis polychloros* L. were seen. A very brilliant race of *Hemaris tityus* L. was caught. We found a single full grown Nymphalid caterpillar which produced a splendid female *Eurodryas desfontainii* GODART on 9th May.

On 11th April we visited a similar biotope at Imouzzèr-du-Kandar where we found almost the same species that we found in Ifrane. Furthermore, we saw a big *Cerura delavoiei* GASCHER hanging on a bush twig and within an hour's time we found many more specimens. The most interesting capture was that of *Callophrys avis* CHAPMAN, a species that is usually found more to the west. About noon we arrived at Annoceur where we found all those interesting species again. However the most striking capture here was that of some specimens of *Cigaritis zohra* DONZEL. These butterflies darted over the very hot places beside the road, resting only very occasionally. The first *Zegris eupheme* ESPER was netted in the neighbourhood and on our way back to the hotel we noticed many *Sinapis incana*, the foodplant of the species, and we planned to return here next morning.



Fig. 4. Female of *Tomares mauretanicus* LUCAS warming up in the early morning sunshine, Imouzzet-du-Kandar, Middle Atlas (nr. 17 on the map) (Foto : W. O. DE PRINS).



Fig. 5. Limestone hills with oaks at Annoceur, Middle Atlas (nr. 17 on the map), biotope of *Zerynthia rumina* L., *Anthocharis belia* L., *Pseudophilotes abencerragus* PIERRET and many others (Foto : W. O. DE PRINS).

But unfortunately, on 12th April, the weather broke and when we walked through the vegetation at Annoeur, the first raindrops started falling. Therefore we decided to return to our Asni headquarters where we arrived in the dark after another 450 km drive. The next day we visited the Taferiate biotope for the second time and again it proved to be very rewarding even though the sky was cloudy. We followed the road from Marrakech to Taferiate until we reached the main mountain pass Tizi-n-Tischka at an altitude of 2260 m. Nothing was on the wing here and it was not until we returned to an altitude of 2000 m in the neighbourhood of Taddert that we saw *Glaucopsyche melanops* BOISDUVAL, *Pseudophilotes abencerragus* PIERRET and *Pyrgus onopordi* RAMBUR. Back in the hotel, we met a most interesting student of the university of Liverpool, who lived amongst the Berbers and who knew the local situation perfectly. He told us that the season was exceptionally late this year and showed us a biotope where he carried out some biological investigations on *Zerynthia rumina* L. of which he showed us eggs, caterpillars and pupae. When we visited the locality the next morning, a very steep slope, it really turned out to be most interesting. In fact we noticed several *Zerynthia rumina* L., some of which were marked for study. But even more interesting was *Colotis evagore* KLUG which was flying over a corn field and in the neighbourhood of its foodplant *Capparis spinosa*. Here we found one specimen of *Callophrys avis* CHAPMAN too.

The next morning, 15th April, we returned to Agadir via Tizi-n-Test. On the southern slopes of the High Atlas, between 1400 and 1500 m altitude, we noticed some bushes *Colutea arborescens* and were lucky to catch some fresh specimens of *Iolana iolas* OCHSENHEIMER. This confirms the occurrence of this large blue butterfly in Morocco. A caterpillar in the seed case of the bush only produced a female of *Lampides boeticus* L. on 10th May. Some specimens of *Colotis evagore* KLUG were netted on nearly the same spot. *Zygaena algira* BSD. was flying very commonly on both sides of the road. In the afternoon the weather became very hot, well over 30°C, but the sky was covered with sand and dust carried by a strong wind from the Sahara desert. While leaving this beautiful country next morning, we were already making plans for a next visit.

During our sojourn we observed Heterocera only occasionally, but we have recorded 20 day-flying species some of which are seldom mentioned in the entomological literature. The following data could be of interest to the students of the faunistics of these species.

ZYGAENIDAE

Zygaena maroccana maroccana ROTHSCHILD : some specimens (Cascades).

Zygaena algira chorista DUJARDIN : very common (Tizi-n-Test, 1400 m).
Zygaena loyselii marmarea DUJARDIN : some specimens (Tiznit).
Zygaena loyselii fracticingulata ROTHSCCHILD : some specimens (Taferiate).

GEOMETRIDAE

Rhodostrophia pudorata quadricalcarata PROUT : some specimens (Cascades, Tizi-n-Test 1700 m, Taferiate).
Idaea exilaria GUENÉE : one female (Col du Zad 1500 m).
Rhodometra sacraria L. : some specimens (El-Kelâa-des-Srarhna, Kasba Tadla).
Toulgoetia cauteriata STAUDINGER : one male (Ifrane), one female (Annoceur).
Bichroma famula brunnea LE CERF : common (Imouzzèr-du-Kandar, Annoceur).
Eurrhantia plummistaria atlanticaria LUCAS : very common but local (Col du Zad 2100 m).
Semiaspilates ochrearia ROSSI : some specimens (Taferiate).

NOTODONTIDAE

Cerura delavoiei GASCHER : common but local (Imouzzèr-du-Kandar).

NOCTUIDAE

Emmelia trabealis SCOPOLI : some pale specimens (Taroudannt, El-Kelâa-des-Srarhna).
Acontia lucida HUFNAGEL : one (Taroudannt), some specimens (Aït-Melloul, El-Kelâa-des-Srarhna and Kasba Tadla).
Autographa gamma LINNAEUS : some specimens (El-Kelâa-des-Srarhna).
Minucia lunaris maura OBERTHÜR : some specimens (Imouzzèr-du-Kandar).
Aleucanitis cailino LEFEBVRE : one specimen (Kasba Tadla).

ARCTIIDAE

Ocnogyna joycei TALBOT : two specimens (Tizi-n-Test 1700 m).

CTENUCHIDAE

Amata mogadorensis BLACHIER : few very fresh specimens, some mating (Taroudannt).

SPHINGIDAE

- Hemaris tityus aksana* LE CERF : some very fresh specimens (Ifrane).
Macroglossum stellatarum LINNAEUS : one specimen (Cascades), another (Tizi-n-Test 1200 m), a full grown larva producing a male on 9th May (Taferiate).

LASIOCAMPIDAE

- Lasiocampa trifolii* DENIS & SCHIFFERMÜLLER : Taroudannt, one caterpillar on *Lotus* producing a male on 15th October 1983 ; El-Kelâa-des-Srarhna, two caterpillars on *Argyritis foetida* one of which produced a female on 17th September 1983 ; Taferiate, several caterpillars on *Zizyphus* but they all died, some after pupating.

In the following list of butterflies observed in Morocco between 2nd and 14th April 1983 we follow the arrangement and nomenclature of RUNGS (1981), except for *Euchloe ausonia* HÜBNER whose southern populations are currently regarded as belonging to *Euchloe simplonia* FREYER.

HESPERIIDAE

- Carcharodus alceae tripolinus* VERITY : some specimens (Taroudannt, Tafraoute, Annoceur).
Carcharodus stauderi romei ROTHSCHILD : one male (Tizi-n-Test 1200 m), another (Tizi-n-Test 1700 m).
Spialia doris daphne EVANS : very local and rare on very hot places (Tafraoute).
Spialia sertorius ali OBERTHÜR : rare at Cascades, some specimens (Tafraoute, Taferiate, Imouzzèr-du-Kandar, Annoceur).
Pyrgus onopordi RAMBUR : one specimen (Col du Zad 2100 m), few specimens (Ifrane, Annoceur, Taddert).
Gegenes nostradamus FABRICIUS : few specimens (Taroudannt).
Gegenes pumilio HOFFMANNSEGG : one specimen (Taroudannt).

PAPILIONIDAE

- Papilio machaon mauritanicus* BLACHIER : one fresh specimen seen (Kasba Tadla), another seen (Taddert).
Iphiclides feisthamelii DUPONCHEL : one seen in each of the following localities : Cascades, Col du Zad 1500 m, Annoceur.
Zerynthia rumina africana STICHEL : few specimens (Taferiate), rather common (Ifrane, Imouzzèr-du-Kandar, Annoceur, Asni).

PIERIDAE

- Anthocharis belia androgyne* LEECH : some fresh specimens (Cascades, Taфраoute, Tizi-n-Test 1700 m, Taferiate, Kasba Tadla, Ifrane, Imouzzèr-du-Kandar, Annoceur, Asni).
- Elphinstonia charlonia charlonia* DONZEL : common (Tiznit, Taroudannt, Aït-Baha), two specimens (Tizi-n-Tarakatine near Taфраoute), some specimens (Taфраoute, Tizi-n-Test 1400 m, Taferiate, El-Kelâa-des-Srarhna, Asni).
- Euchloe simplonia melanochloros* RÖBER : common (Taroudannt, Ifrane, Imouzzèr-du-Kandar, Annoceur, Asni), very common in an orchard (Kasba Tadla), some specimens (Tizi-n-Test 1700 m, Col du Zad 1500 m, Mischliffen), isolated specimens (Tizi-n-Tarakatine near Taфраoute).
- Euchloe belemia distincta* RÖBER : common (Tiznit, Kasba Tadla), some specimens (Taroudannt, Aït-Melloul, Taferiate, El-Kelâa-des-Srarhna, Annoceur, Asni).
- Zegris eupheme maroccana* BERNARDI : very few specimens, just emerging (Annoceur).
- Colotis evagore nouna* LUCAS : some specimens (Tizi-n-Test between 1200 and 1500 m, Asni).
- Pontia daplidice nitida* VERITY : some specimens (Tiznit, Taroudannt, Aït-Baha, Taфраoute, Taferiate).
- Pieris rapae mauritanica* VERITY : some specimens (Tiznit, Taddert) : very common (Taroudannt, Kasba Tadla, Asni), isolated specimens (Tizi-n-Tarakatine near Taфраoute).
- Pieris brassicae brassicae* LINNAEUS : some specimens seen (Cascades), some specimens (Tizi-n-Test 1400 and 1700 m, Imouzzèr-du-Kandar, Annoceur, Taddert, Asni).
- Colias crocea crocea* GEOFFROY : several seen (Cascades), some specimens (Tiznit, Tizi-n-Test 1700 m, Annoceur, Asni), very common (Taroudannt).
- Gonepteryx rhamni meridionalis* RÖBER : few specimens (Imouzzèr-du-Kandar, Annoceur, Asni).
- Gonepteryx cleopatra cleopatra* LINNAEUS : some specimens seen (Cascades), common (Taroudannt, Imouzzèr-du-Kandar, Annoceur, Asni).

LYCAENIDAE

- Callophrys rubi fervida* STAUDINGER : some specimens (Cascades), Tizi-n-Test between 1200 and 1400 m, Taferiate, Ifrane, Annoceur).

- Callophrys avis barragueti* DUJARDIN : very few (Imouzzèr-du-Kandar, Asni).
- Tomares ballus* FABRICIUS : one very fresh male (Tafraoute), common (Taferiate, Ifrane), few specimens (Kasba Tadla, Asni).
- Tomares mauretanicus* LUCAS : some specimens, most of them already worn (Cascades), common (Taferiate, Ifrane), very common but very local (Mischliffen), some specimens (Imouzzèr-du-Kandar, Annoceur).
- Lycaena phlaeas* LINNAEUS : some specimens, never plentiful (Taroudannt, Aït-Baha, Tizi-n-Test 1700 m, Taferiate, Kasba Tadla, Col du Zad 2100 m, Ifrane, Imouzzèr-du-Kandar, Annoceur).
- Cigaritis allardi occidentalis* LE CERF : few specimens (Cascades).
- Cigaritis zohra monticola* RILEY : few specimens (Annoceur).
- Lampides boeticus* LINNAEUS : some specimens (Taroudannt, Tizi-n-Test 1400 m, El-Kelâa-des-Srarhna, Kasba Tadla).
- Syntarucus pirithous* LINNAEUS : rare (Cascades), some specimens, already worn (Taroudannt), some specimens (Tizi-n-Test 1200 m, Kasba Tadla).
- Tarucus teophrastus* FABRICIUS : some isolated specimens (Taroudannt), common (Aït-Melloul), very common (Aït-Baha), few specimens (Tizi-n-Tarakatine near Tafraoute, Taferiate).
- Tarucus rosaceus* AUSTAUT : few specimens (Aït-Melloul).
- Cupido lorquini* HERRICH-SCHÄFFER : some worn specimens (Tizi-n-Test 1400 m), rather common (Taferiate, Ifrane), some specimens (Imouzzèr-du-Kandar, Annoceur).
- Azanus jesous* GUÉRIN-MÉNEVILLE : one specimen beside the road to Cascades in the neighbourhood of Oulmès, some specimens (Tafraoute), rather common (Taferiate).
- Aricia cramera* ESCHSCHOLTZ : few specimens (Ifrane, Imouzzèr-du-Kandar).
- Polyommatus icarus celina* AUSTAUT : some specimens (Cascades, Ifrane, Imouzzèr-du-Kandar, Annoceur, Taddert), common (Tiznit).
- Lysandra punctifera* OBERTHÜR : one worn male (Tizi-n-Test 1200 m), few specimens (Tizi-n-Test 1400 m), some specimens (Ifrane, Imouzzèr-du-Kandar, Annoceur).
- Pseudophilotes abencerragus* PIERRET : some specimens, never numerous (Cascades, Tizi-n-Test 1200 and 1400 m, Taferiate, Kasba Tadla, Imouzzèr-du-Kandar, Annoceur, Taddert).
- Iolana iolas debilitata* SCHULTZ : some very fresh specimens flying around *Colutea arborescens* (Tizi-n-Test 1400 m).
- Glaucoopsyche melanops alluaudi* OBERTHÜR : isolated specimens (Tizi-n-Test 1400 and 1700 m, Taddert).

- Glaucopsyche melanops algirica* HEYNE : few specimens (Annoceur).
Zizeeria knysna TRIMEN : common (Tiznit), some specimens (Taroudannt, Annoceur).
Celastrina argiolus mauritanica ROTHSCHILD : few specimens (Ifrane, Asni).

DANAIDAE

- Danaus chrysippus* LINNAEUS : common (Taroudannt).

NYMPHALIDAE

- Vanessa atalanta* LINNAEUS : some specimens seen (Asni).
Cynthia cardui LINNAEUS : one specimen seen (Cascades, Col du Zad 2100 m), some specimens (Asni).
Polygonia c-album imperfecta BLACHIER : some specimens (Asni).
Nymphalis polychloros erythromelas AUSTAUT : some worn specimens (Ifrane, Imouzzèr-du-Kandar).
Melitaea didyma occidentalis STAUDINGER : some fresh specimens (Cascades, Aït-Baha, Tizi-n-Test between 1200 and 1700 m, Asni).
Melitaea phoebe punica OBERTHÜR : some fresh specimens (Taferiate, Tizi-n-Test between 1200 and 1700 m, Col du Zad 1500 m).
Eurodryas desfontainii gibrati OBERTHÜR : one larva which produced a female on 9th May (Ifrane).
Issoria lathonia LINNAEUS : some specimens (Tizi-n-Test 1700 m, Mischlif-fen, Annoceur).

SATYRIDAE

- Pararge aegeria aegeria* LINNAEUS : one seen (Cascades), some specimens (Taferiate, Kasba Tadla, Imouzzèr-du-Kandar, Asni).
Lasiommata megera LINNAEUS : some specimens (Tizi-n-Test 1200 and 1700 m, Kasba Tadla, Asni).
Melanargia ines HOFFMANNSEGG : isolated specimen (Tizi-n-Test 1400 m), few specimens (Taferiate).
Coenonympha pamphilus lyllus ESPER : some specimens (Taferiate, Kasba Tadla, Ifrane, Imouzzèr-du-Kandar, Annoceur).

Acknowledgement

We wish to thank Ch. E. E. RUNGS and J.-M. MAIRIAUX for their valuable help and information.

References

- DE LAEVER, R., 1971. Chasses au Maroc. Cercle Léop. Belg. *Compte Rendu* : 81-82.
- DE WORMS, C., 1965. Spring collection in Morocco. *Ent. Rec. J. Var.*, **77** : 177-182.
- DUTREIX, Cl. & R. ESSAYAN, 1982. Du Plateau Côte d'orien au Moyen-Atlas : 11 au 21 avril 1981. *Linneana Belgica*, VIII (12) : 521-526.
- KUDRNA, O., 1972. On some Moroccan Butterflies. *Ent. Rec. J. Var.*, **84** : 267-268.
- RUNGS, Ch. E. E., 1981. Catalogue raisonné des Lépidoptères du Maroc. Inventaire faunistique et observations écologiques. Tome II. *Trav. Inst. Sc., Série Zool., Rabat*, **40** : 223-588.
- SCHMIDT-KOEHL, W., 1978. Tagfalterbeobachtungen in Marokko (Mittlerer Atlas. Hoher Atlas) und in Süds Spanien (Sierra Nevada) im Juli und August 1977 (Insecta Lepidoptera). *Mitt. ent. Ges. Basel*, N.F., **28** : 25-50.
- SCHURMANS, J., 1976. De dagvlinders van Marokko. *Phegea*, **4** : 33-55.
- VARIN, G., 1976. Chasses entomologiques au Maroc. *Alexandor*, **1** : 90-95, 123-126.
- WAGENER, S., 1952. Beitrag zur Lepidopterenfauna des Hohen Atlas in Marokko. *Ent. Z., Frankf. a. Main*, **62** : 97-102.
- WEISS, J.-C., 1981. Variation dans la répartition et l'habitus des lépidoptères endémiques de la région du sud paléarctique occidental. *Linneana Belgica*, VIII (5) : 201-206.
- ZERNY, H., 1935. Die Lepidopterenfauna des Grossen Atlas in Marokko und seiner Randgebiete. *Mém. Soc. Sc. nat. Maroc*, **42** : 1-157, pl. I-II.